INITIAL ALTERNATIVES INFORMATION REPORT

Final Draft

Los Vaqueros Expansion Investigation, California

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

CONTRA COSTA WATER DISTRICT

EXECUTIVE SUMMARY

The primary purpose of this Initial Alternatives Information Report (IAIR) is to document the first phase of feasibility studies for the Los Vaqueros Expansion Investigation (LVE). Specifically, this report describes formulation of initial alternative plans to address the problems, opportunities, and planning objectives identified for the LVE that primarily involve enlarging Los Vaqueros Reservoir in Contra Costa County.

BACKGROUND

The United States Department of the Interior, Bureau of Reclamation (Reclamation), California Department of Water Resources (DWR), and Contra Costa Water District (CCWD) began appraisal-level studies in 2001 of the potential to expand Los Vaqueros Reservoir to address regional water quality and supply reliability needs. Expanding Los Vaqueros is one of five potential surface water storage projects identified by the CALFED Bay-Delta Program (CALFED) as warranting further study. Reclamation was directed in Public Law 108-7 (Omnibus Appropriations Act of 2003) to conduct a feasibility-level investigation of the potential expansion of Los Vaqueros Reservoir. Initial results of the first phase of the feasibility investigation are described in this IAIR.

CCWD is the owner and operator of the existing Los Vaqueros Dam and Reservoir, which has a total capacity of 100,000 acre-feet and is located in the Kellogg Creek watershed of Contra Costa County, California. Construction of the existing facility was completed in 1997 to address seasonal water quality degradation associated with CCWD's Sacramento-San Joaquin Delta (Delta) water supplies. The reservoir also provides emergency supply storage and, as secondary benefits, recreation and flood control.

Los Vaqueros Reservoir

As the demand for water in California increases in the future, water resource conflicts in the Delta are likely to intensify. Like many Delta water users, agencies in the San Francisco Bay Area (Bay Area) rely on a variety of local and imported water sources to meet their growing demands. But despite aggressive conservation programs, surface and groundwater storage programs, and water transfer agreements, Bay Area water agencies face substantial cutbacks in water supplies during dry and critically dry years, and degradation in water quality during certain periods.

In recognition of environmental and water resource conflicts in the Delta, a consortium of Federal and State agencies collaborated to create the CALFED Bay-Delta Program. The CALFED Programmatic Record of Decision (ROD), dated August 28, 2000, describes a long-

term comprehensive plan to restore the ecological health of the San Francisco Bay/Delta system and improve water management for all beneficial uses. The Storage Program, one of numerous program elements described in the ROD, identified investigating five potential surface water storage projects: raising Shasta Dam, offstream storage north of the Delta, increased storage in the upper San Joaquin River basin, in-Delta storage, and expansion of Los Vaqueros Reservoir. The CALFED ROD recognized that expanding the existing capacity of Los Vaqueros Reservoir by as much as 400,000 acre-feet could contribute to improving the quality and reliability of Bay Area drinking water supplies delivered from the Delta.

Another program element of the CALFED ROD is the Environmental Water Account (EWA), which facilitates pumping curtailments in the south Delta and other changes to Central Valley Project (CVP) and State Water Project (SWP) operations, to protect at-risk fisheries. To date, the short-term EWA has relied on transfer market water purchases and short-term transfer agreements to secure water supplies for EWA actions. It is expected that some form of the EWA will continue in the future with a primary focus on offsetting water delivery reductions resulting from regulatory actions that curtail Delta pumping to protect at-risk fish. However, a great deal of uncertainty exists regarding the cost of water for programs such as the EWA in the future. Accordingly, an opportunity exists to evaluate whether an expanded Los Vaqueros Reservoir, as part of a regional water resources project, could provide a less-costly and more reliable source of replacement water to the EWA or a similar long-term program. In addition to cost, an expanded Los Vaqueros Reservoir could also provide dedicated storage and conveyance capacity for the EWA, rather than relying on surplus storage space in CVP and SWP reservoirs and surplus south Delta pumping capacity to store and move EWA assets.

Growing demands for additional water supplies and the need for effectively implementing the EWA program consistent with the intent of the CALFED ROD prompted Reclamation and DWR, in cooperation with CCWD, to begin a Federal feasibility investigation in 2003 of the potential expansion of Los Vaqueros Reservoir. The LVE has the following mission:

> *The purpose of the Los Vaqueros Expansion Investigation is to identify and evaluate opportunities to increase drought period water supply reliability for Bay Area water providers; provide a less-costly environmental water supply to facilitate EWA fish protection and recovery actions in the Delta; and, to the extent possible through exploring these opportunities, improve the quality of water delivered to Bay Area water users.*

Reclamation and DWR are the Federal and State agencies conducting the investigation, respectively. CCWD, as owner of the existing Los Vaqueros Project, also has an integral role in the LVE, and has worked under contract to DWR and Reclamation to perform engineering studies and environmental review.

STUDY AREA

The study area for the LVE includes the Los Vaqueros Reservoir watershed and associated dam and reservoir facilities, which are situated in the coastal foothills west of the Delta and east of the Bay Area, the central and south Delta, and service areas of Bay Area water agencies that may be

directly affected by the project. The Bay Area water agencies that may be directly affected include CCWD, Alameda County Water District, Santa Clara Valley Water District, and Alameda County Flood Control and Water Conservation District, Zone 7. Due to the potential influence on other programs and projects, an extended study area includes the service areas of other Bay Area water agencies and the Central Valley of California. Other Bay Area water agencies that may be indirectly affected by the project include East Bay Municipal Utility District and the San Francisco Public Utilities Commission.

PLAN FORMULATION PROCESS

The Federal planning process for the LVE is divided into three major phases: the Initial Plans Phase (documented herein), Alternative Plans Phase, and Recommended Plan Phase. **Figure ES-1** illustrates the relationship of the three LVE phases, including their primary focus and resulting summary documentation.

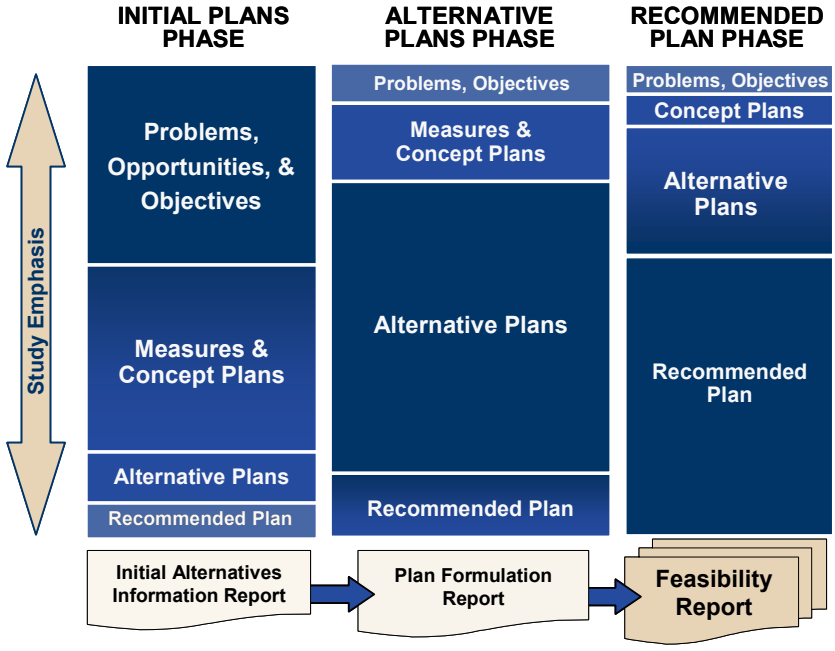

FIGURE ES-1 – PLAN FORMULATION PROCESS

This IAIR describes the formulation of initial plans to address planning objectives identified for the LVE. From these initial plans, comprehensive alternative plans will be developed in later phases of the investigation, and documented in greater detail in the ensuing Plan Formulation Report and Feasibility Report. The planning process for the LVE is consistent with the Federal *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. The scope of the IAIR and location in the document where topics are discussed are as follows:

- Description of existing and likely future without-project water resources conditions in the study area (**Chapter III**).
- Identification of the water resources problems and opportunities being addressed in the LVE (**Chapter IV**).
- Development of planning objectives to address identified problems and opportunities and planning constraints and criteria (**Chapter V**).
- Identification and evaluation of individual resource management measures to address each planning objective (**Chapter VI**).
- Formulation of a set of concept plans representing a range of potential actions (**Chapter VII**).
- From these plans, identification of initial alternatives to be further developed in the LVE (**Chapter VIII**).

The IAIR should be considered a work-in-progress document that will evolve as the investigation progresses into a Federal Feasibility Report. Consequently, the conclusions herein are expected to mature as additional studies and evaluations are conducted. While this document was drafted specifically to inform Federal decision-makers on subjects relevant to potential Federal participation in the project, it also may provide useful information to participating non-Federal agencies and stakeholders.

STUDY OBJECTIVES

The following objectives were developed on the basis of the identified problems and opportunities in the study area in relation to study authorities, Federal planning guidance, and Reclamation direction:

- *Increase water supply reliability for water providers within the study area, principally to help meet municipal and industrial water demands during drought periods, with a focus on enlarging Los Vaqueros Reservoir.*
- *Use an expanded Los Vaqueros Reservoir to develop replacement water supplies for the long-term Environmental Water Account, if the cost of water provided from an expanded reservoir is found to be less than the cost of water for continued implementation of that program.*
- *To the extent possible through pursuit of the water supply reliability and environmental water objectives, improve the quality of water deliveries to municipal and industrial customers in the study area.*

In addition to the study objectives, various planning constraints, principles, and criteria were identified to help guide the investigation. CCWD Board of Director's Resolution No. 03-24, June 25, 2003, provides important guidance for identifying and evaluating plans involving the expansion of Los Vaqueros Reservoir (see **Chapters II** and **XI** for resolution and related ballot language and discussion of CCWD's principles of participation).

RESOURCE MANAGEMENT MEASURES

A resource management measure is any structural or non-structural action that could address one or more of the planning objectives. Over 30 measures were identified to address the objectives of the LVE. Nine measures were selected for further consideration and development and potential inclusion in concept plans, as summarized in **Table ES-1**.

TABLE ES-1
MEASURES RETAINED TO ADDRESS PLANNING OBJECTIVES

Planning Objectives Addressed	Resource Management Measures Retained	
Bay Area Water Supply Reliability	Raise Los Vaqueros Dam In-Place	Increase storage space in Los Vaqueros Reservoir by up to 25,000 acre-feet by raising the height of the existing dam in-place
	Enlarge Los Vaqueros Dam and Reservoir	Increase storage space in Los Vaqueros Reservoir by up to 400,000 acre-feet by removing and replacing the existing dam with a substantially larger facility
	Increase Delta Diversion Capacity	Increase the capacity of Delta diversion(s) to Bay Area users
	Construct Intertie from Los Vaqueros Reservoir to the Dyer Canal	Construct a new pipeline and pump station to convey water from Los Vaqueros to the Dyer Canal segment of the South Bay Aqueduct
	Desalination	Develop desalination and associated conveyance facilities in Bay-Delta or Pacific locations(s)
Less-Costly EWA Replacement Supply	Enlarge Los Vaqueros Reservoir	Enlarge Los Vaqueros Reservoir to store surplus Delta flows for later EWA use
	Construct Intertie from Los Vaqueros Reservoir to Bethany Reservoir	Construct a new gravity pipeline to convey stored water from Los Vaqueros to Bethany Reservoir
	Construct Intertie from Los Vaqueros Reservoir to the Dyer Canal	Construct a new pipeline and pump station to convey stored water from Los Vaqueros to the Dyer Canal segment of the South Bay Aqueduct
Water Quality	Reservoir / Delivery System Reoperation	Reoperate an enlarged Los Vaqueros Reservoir to improve delivered water quality

KEY: Bay Area = San Francisco Bay Area EWA = Environmental Water Account
Bay-Delta = San Francisco Bay / Sacramento – San Joaquin Delta Estuary

CONCEPT PLANS

Eight concept plans were formulated from the retained management measures shown in **Table ES-1**, representing an array of different strategies to address the planning objectives consistent with the planning criteria, constraints, and principles. The concept plans are intended to promote discussion and help identify concepts that warrant further development into complete alternative plans, with input from participating agencies, stakeholders, and the public. The concept plans are not considered complete alternative plans for various reasons, but primarily because facility sizes have not been refined and specific impacts and mitigation measures have not been identified. The concept plans are highlighted below and their major features, accomplishments, and costs are summarized in **Table ES-2.**

TABLE ES-2
CONCEPT PLAN FEATURES, ACCOMPLISHMENTS, AND COSTS

Concept Plan Focus	Bay Area Water Supply Reliability			EWA Replacement Supply		Combined Objectives		
Item	1 Raise Los Vaqueros Dam In-Place	2 Enlarge Los Vaqueros Dam & Reservoir	3 Desalination w/ Storage (Enlarge Los Vaqueros)	4 Enlarge Los Vaqueros with Dyer Canal Intertie	5 Enlarge Los Vaqueros with Bethany Reservoir Intertie	6 Water Supply/ EWA Combination w/ Dyer Canal Intertie	7 Water Supply/ EWA Combination w/ Bethany Reservoir Intertie	8 Water Supply/ EWA Combination w/ Water Quality
Concept Plan Features [1]								
Los Vaqueros Capacity (TAF)	125	500	500	500	500	500	500	500
Delta Pumping Capacity (cfs) [2]	750	750	750	1,000	1,750	1,750	1,750	1,750
Los Vaqueros Delivery Intertie Location	Dyer Canal	Dyer Canal	Dyer Canal	Dyer Canal	Bethany Reservoir	Dyer Canal	Bethany Reservoir	Dyer Canal
Desalination Capacity (mgd)	-	-	20	-	-	-	-	-
Accomplishments [3]								
Drought Period Yield (TAF/Year) [4]	43	95	110	-	-	34	19	47
Drought Period Shortage Reduction [5]	*28%*	*63%*	*72%*	-	-	*22%*	*13%*	*31%*
EWA Replacement Yield (TAF/year) [6]	-	-	-	140	190	142	173	81
Contribution to EWA [7]	-	-	-	*62%*	*84%*	*63%*	*77%*	*36%*
Decrease in Salinity (mg/L Cl) [8]	11	15	13	16	16	17	15	44 [11]
Costs ($ millions) [9]								
Total First Cost	470	1,050	1,260	1,170	1,470	1,540	1,470	1,540
Present Value Cost [10]	720	1,640	2,270	1,590	2,010	2,160	2,040	2,160

KEY: Cl = chlorides cfs = cubic feet per second EWA = Environmental Water Account mgd = million gallons per day mg/L = milligrams per liter TAF = thousand acre-feet

Notes:

1. *Reservoir storage, pumping, conveyance, and desalination capacities are preliminary estimates, and except as noted in Chapter VII, are sized considering cost efficiency.*
2. *Includes existing diversion and pumping capacity at Old River to Contra Costa Water District (CCWD) of 250 cfs.*
3. *Accomplishments of all concept plans (water supply reliability, EWA replacement, and water quality improvements) are in addition to the without-project condition, which includes Los Vaqueros Reservoir at 100,000 acre-feet, 250 cfs Delta diversion at Old River, and all deliveries made to meet CCWD demands.*
4. *Drought period is defined as October 1986 through September 1992. Future modeling will redefine period to be identical with CALFED Common Assumptions metrics.*
5. *Based on preliminary estimate of 2020 average annual drought period shortage in the region of 152,000 acre-feet; future studies will better quantify shortages in the area.*
6. *EWA replacement supply is based on average annual yield.*
7. *Contribution to EWA based on average annual EWA water acquisition goal of 225,000 acre-feet, consistent with the CVP and SWP Operations Criteria and Plan, 2004. The EWA typically purchases from 200,000 to 300,000 acre-feet per year.*
8. *Long-term average decrease in salinity for deliveries to the South Bay Aqueduct as compared to Clifton Court Forebay salinity values.*
9. *Preliminary cost estimates based on October 2004 pricing levels and rounded to nearest $10 million.*
10. *Includes first cost; interest during construction; and annual operation, maintenance, major replacement allowance, and energy costs computed at a present value over a 100-year period of analysis at 5-3/8 percent interest rate.*
11. *Water quality accomplishments will be reviewed with improved operating logic in future studies.*

The eight concept plans were divided into three sets to address the LVE objectives. The first set focuses on Bay Area water supply reliability, the second on providing a less-costly EWA replacement supply, and the third set of plans was developed to include a combination of measures to address multiple study objectives. Note that the concept plans are not complete alternative plans. Rather, these plans are intended to distinguish different ways the study objectives could be addressed, and to represent a range of potential actions. The facility sizes and combinations shown in the table were selected because they appear to be the most efficient and/or effective based on preliminary evaluations. However, specific facility sizes and combinations will be studied and refined for those plans carried into future phases of the LVE.

Concept Plans Focused on Bay Area Water Supply Reliability

Three concept plans (1 through 3) were formulated that focus on improving water supply reliability for Bay Area water users. These concept plans represent three fundamentally different strategies to address the water supply reliability objective using various combinations of the retained measures: a small dam raise strategy, a major reservoir expansion strategy, and a regional desalination strategy. Because each of the plans focusing on Bay Area water supply reliability also includes diverting water from the Delta during surplus flow conditions, when water quality is typically good, each of the plans also would provide water quality benefits.

1 – Raise Los Vaqueros Dam In-Place for Water Bay Area Supply Reliability – The focus of this concept plan is on increasing water supply reliability through a small raise of the existing Los Vaqueros Dam. Initial studies indicate that the existing dam could be raised by as much as 15 feet, without major reconstruction, to create up to 25,000 acre-feet of additional storage. Surplus Delta flows would be conveyed to the expanded reservoir through new central Delta diversion and conveyance facilities, and water deliveries from the reservoir to South Bay Aqueduct (SBA) agencies would be made via an intertie to the Dyer Canal segment of the SBA, as illustrated in **Figure ES-2**. The additional storage would improve dry-year water supply reliability for CCWD and SBA water agencies.

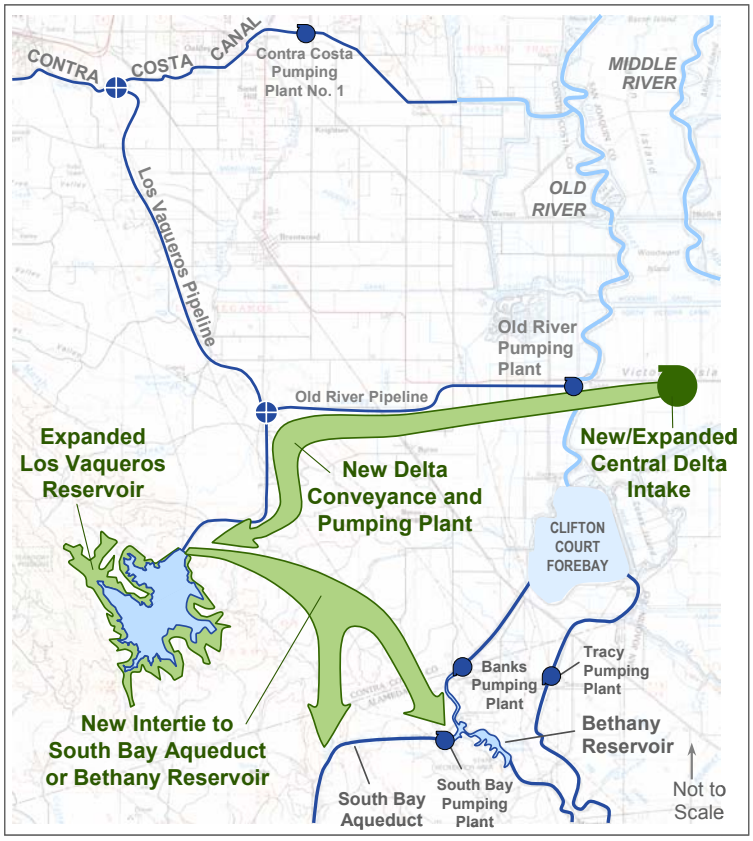

FIGURE ES-2 - ELEMENTS ASSOCIATED WITH AN EXPANSION OF LOS VAQUEROS RESERVOIR

2 – Enlarge Los Vaqueros Dam and Reservoir for Bay Area Water Supply Reliability – This concept plan includes a much larger expansion of Los Vaqueros Reservoir. It would require demolishing the existing dam and constructing a larger dam capable of storing as much as 400,000 acre-feet in addition to the existing 100,000-acre-foot Los Vaqueros Reservoir. Similar to the previous plan, surplus Delta flows would be conveyed to the expanded reservoir, and water would be delivered to SBA agencies through a new intertie to the Dyer Canal. This plan would improve dry-year water supply reliability for CCWD and SBA water agencies.

3 – Desalination with Storage (Enlarge Los Vaqueros Reservoir) for Bay Area Water Supply Reliability – The focus of this concept plan is on increasing water supply reliability through construction of a regional desalination facility in the Bay Area. The exact location and size of the desalination facility would be determined by future studies. Because desalination facilities are most efficient when operated continuously (rather than only during drought conditions, for example), dry period supply reliability benefits are achieved when desalination is combined with storage. In this way, a desalination plant would operate continuously and its supplies used in lieu of other base supplies; the exchanged base supplies, such as contract water, and any excess desalinated supplies would be stored for use during dry periods. For this reason and to take full advantage of a large-scale desalination facility, this plan includes new local storage, by enlarging Los Vaqueros Reservoir, for the purpose of storing excess desalinated water supplies and/or project water. Similar to previous plans, deliveries would be made from Los Vaqueros Reservoir to SBA agencies via a new intertie to the Dyer Canal.

Concept Plans Focused on EWA Replacement Supply

Two concept plans were developed specifically to provide a long-term replacement water supply for the EWA. Supplies developed by these plans would be used in lieu of transfer market purchases and short-term transfer agreements, the primary water acquisition methods used under the current program. In both plans, water would be diverted from the Delta during surplus flow conditions to an enlarged Los Vaqueros Reservoir. Contract deliveries would be made to SBA water users from the expanded reservoir; the resulting pumping reduction at Banks Pumping Plant then could be used either to deliver EWA supplies south of the Delta or to directly accommodate EWA fish actions (pumping curtailments) at the export facilities, as determined by the EWA agencies. Water supplies developed in the reservoir would effectively replace a portion of the EWA's south of Delta purchases. Both of the concept plans focused on EWA replacement supplies could provide incidental water quality benefits.

4 – Enlarge Los Vaqueros Reservoir with Dyer Canal Intertie for EWA – This plan is focused on providing a replacement water supply for a long-term EWA through enlarging the existing Los Vaqueros Reservoir by as much as 400,000 acre-feet and constructing an intertie between the expanded reservoir and the SBA at the Dyer Canal. Delta diversion and conveyance facilities would be enlarged to fill the expanded reservoir during periods of surplus Delta flow; these supplies would be delivered to SBA agencies in lieu of project deliveries via the South Bay Pumping Plant. The intertie would pump water from the expanded reservoir to the Dyer Canal segment of the SBA.

5 – Enlarge Los Vaqueros Reservoir with Bethany Reservoir Intertie for EWA – This concept plan is similar to the previous plan, but water would be delivered either from the expanded reservoir or directly from enlarging Delta pumping and conveyance facilities to the SWP's Bethany Reservoir. Supplies delivered to Bethany from the expanded reservoir via a gravity intertie then would be pumped to SBA agencies via the existing South Bay Pumping Plant, or through the California Aqueduct for other EWA purposes (such as storage in San Luis Reservoir or delivery to other CVP/SWP users impacted by EWA Delta pumping curtailments). A flow separation structure would prevent higher quality Los Vaqueros supplies being delivered to SBA users from mixing with lower quality Bethany Reservoir supplies.

It should be mentioned that a project including an intertie from Los Vaqueros to Bethany Reservoir would not gain local acceptability without certain operating constraints or restrictions that would satisfy the CCWD Principles of Participation (described in **Chapter II**), in particular that the project would provide for long-term environmental benefits in the Delta by supplying water for the EWA. Water could be supplied for the EWA through either reductions in Delta pumping to benefit fisheries, or replacing south of Delta EWA purchases. In addition, the project could not be operated in conjunction with a peripheral canal or to increase the export of water from Northern California. Just as would be required in the case of a Dyer Canal intertie, permit terms and conditions, as well as contractual arrangements, would be required to ensure that the CCWD principles are satisfied.

Concept Plans Focused on Combined Objectives

Three representative combination plans were formulated from the retained resource management measures to address multiple study objectives. All three combined objective plans provide both water supply reliability and EWA replacement supply benefits, and the third plan is formulated to provide additional water quality benefits.

6 – Water Supply / EWA Combination with Dyer Canal Intertie – This concept plan would provide both water supply reliability benefits and an EWA replacement supply through enlarging the existing Los Vaqueros Reservoir by as much as 400,000 acre-feet in combination with a new intertie to the Dyer Canal segment of the SBA. Delta diversion and conveyance capacity would be increased to supply the enlarged reservoir with surplus Delta flows. A portion of the additional storage space would be dedicated to improving dry period water supply reliability for CCWD and SBA users, and the remainder would be dedicated to EWA purposes.

7 – Water Supply / EWA Combination with Bethany Reservoir Intertie – Similar to the previous plan, this concept plan would provide both water supply reliability benefits and an EWA replacement supply, but a new intertie would connect the expanded reservoir with Bethany Reservoir. This plan would not gain local acceptability without requiring certain operating constraints or restrictions that would satisfy the CCWD principles, in particular that the project would provide for long-term environmental benefits in the Delta by supplying water for the EWA. Water could be supplied for the EWA through either reductions in Delta pumping to benefit fisheries, or replacing south of Delta EWA purchases. In addition, the project could not be operated in conjunction with a peripheral canal or to increase the export

of Delta water from Northern California. Just as would be required in the case of connection at the Dyer Canal, permit terms and conditions, as well as contractual arrangements, would be required to ensure that the CCWD principles are satisfied.

8 – Water Supply / EWA Combination with Water Quality Improvements – This concept plan would focus on providing water supply reliability and quality improvements and an EWA replacement supply. Facilities would be similar to the combined objective Concept Plan 6, including increased Delta diversion and conveyance capacity to the expanded reservoir and an intertie to the Dyer Canal segment of the SBA. Portions of the new storage space in Los Vaqueros Reservoir would be dedicated to Bay Area water supply reliability and EWA replacement supply purposes similar to the previous plans. However, unlike Concept Plan 6, the reservoir would be operated to provide additional water quality benefits for Bay Area users.

INITIAL ALTERNATIVES

The concept plans described above were compared against four general criteria: completeness, effectiveness, efficiency, and acceptability. This comparison is summarized in **Table ES-3**. An overall relative ranking of the concept plans also is presented in the table, which was used, along with other information, to determine if a concept plan should be considered further in the LVE plan formulation process. It is important to remember that there are many potential combinations of facility sizes (reservoir and pump station capacity, for example) that could be included in each concept plan described above. Accordingly, the recommendations in **Table ES-3** apply primarily to the combination of measures and facilities represented by each plan, with the assumption that appropriate facility sizes or applications will be refined in future studies.

Based on this comparison, and the ability of plans to address LVE study objectives, seven concept plans were identified for further consideration as initial alternatives in the LVE:

Concept Plan 1 - Raise Los Vaqueros Dam In-Place for Bay Area Water Supply Reliability

Concept Plan 2 - Enlarge Los Vaqueros Dam and Reservoir for Bay Area Water Supply Reliability

Concept Plan 4 - Enlarge Los Vaqueros with Dyer Canal Intertie for EWA

Concept Plan 5 - Enlarge Los Vaqueros Reservoir with Bethany Reservoir Intertie for EWA

Concept Plan 6 - Water Supply / EWA Combination with Dyer Canal Intertie

Concept Plan 7 - Water Supply / EWA Combination with Bethany Reservoir Intertie

Concept Plan 8 - Water Supply / EWA Combination with Water Quality Improvements

TABLE ES-3
SUMMARY COMPARISON OF CONCEPT PLANS

Concept Plans	Comparison Criteria				Overall Relative Ranking	Further Development Status
	Completeness	Effectiveness	Efficiency	Acceptability		
Bay Area Water Supply Reliability Focus						
1- Raise Los Vaqueros Dam In-Place for Water Supply Reliability	High	Low	Moderate	High	**Moderate**	Although lower yield, **identified for further development** because of very low implementation cost.
2- Enlarge Los Vaqueros Dam & Reservoir for Water Supply Reliability	High	Moderate	Moderate	High	**Moderate - High**	**Identified for further development** because of potential to address water supply reliability for Bay Area.
3- Desalination with Storage (Enlarge Los Vaqueros Reservoir) for Water Supply Reliability	Moderate	Moderate	Low - Moderate	Moderate	**Low - Moderate**	**Not identified for further consideration** as a stand-alone alternative because of highest cost per unit of output of any plan considered and potential difficulty to mitigate adverse impacts to acceptable levels. Desalination should, however, be considered as a potential increment of any plan if found to be economically viable and otherwise implementable.
EWA Replacement Supply Focus						
4- Enlarge Los Vaqueros with Dyer Canal Intertie for EWA	High	Low - Moderate	Moderate	Moderate - High	**Moderate**	Although not as efficient as an intertie to Bethany Reservoir, at this level of study this concept plan was retained and **identified for further development** .
5- Enlarge Los Vaqueros with Bethany Reservoir Intertie for EWA	High	Moderate - High	Moderate	Moderate- High	**Moderate - High**	**Identified for further development** primarily because it would yield the largest potential EWA replacement supply.
Combined Objective Focus						
6- Water Supply / EWA Combination with Dyer Canal Intertie	High	Moderate	Moderate- High	High	**High**	Although relatively low yields, **identified for further development** because of low to moderate unit costs for both supply reliability and EWA replacement supply.
7- Water Supply / EWA Combination with Bethany Reservoir Intertie	High	Moderate - High	Moderate- High	High	**High**	**Identified for further development** primarily because it would result in the lowest unit cost for EWA replacement supply, and has high potential for Federal interest.
8- Water Supply / EWA Combination with Water Quality Improvements	High	Moderate	Low - Moderate	High	**Moderate - High**	**Identified for further development** primarily because it is consistent with the plan in the CALFED ROD and balances study objectives.

KEY: CALFED = CALFED Bay-Delta Program EWA = Environmental Water Account ROD = Record of Decision

These initial alternatives represent starting points for further formulation of detailed alternative plans, to be evaluated and considered in the Feasibility Report and supporting documentation. Further studies will refine the plans and their components, including determining the most appropriate and efficient sizes, locations, and alignments of facilities. Desalination with new storage, represented in Concept Plan 3, was not identified for further development as a stand-alone alternative. However, it is believed that a desalination facility should be considered similar to other source water diversion and treatment options as a potential increment to detailed alternative plans to be developed in the next phase of study.

Each of the initial alternatives identified for further development contributes to increasing Bay Area water supply reliability and/or providing an EWA replacement supply, and all of the initial alternatives can contribute, to some degree, to improving delivered water quality. Since a Federal interest exists in participating in the EWA, a Federal interest may exist in enlarging Los Vaqueros Reservoir to accomplish similar goals. The degree and magnitude of the potential Federal interest in any alternative will need to be confirmed and quantified as part of future phases of the LVE. It is also believed that the initial alternatives recommended for further development in the next phase of the investigation could be formulated in a manner consistent with the CCWD Board of Directors Principles of Participation for a project involving the enlargement of Los Vaqueros Dam and Reservoir.

PROJECT MANAGEMENT AND PUBLIC INVOLVEMENT

Management of the LVE is carried out by a Study Management Team, which consists of project managers from Reclamation, DWR, and CCWD. This team is responsible for managing the feasibility investigation and preparing necessary decision documents, and briefing an Agency Coordination Work Group (ACWG) on progress and findings. The ACWG is composed of senior representatives from Federal, State, and local agencies, and provides comments and policy-level guidance to the Study Management Team. Day-to-day technical work on the LVE is supervised by a Project Coordination Team, which consists of leaders for the major disciplines: engineering, environmental compliance and analysis, plan formulation, modeling, public involvement, economics, and others, as needed.

Public involvement has been ongoing throughout the LVE, and a detailed public involvement program plan was developed as part of previous study efforts. Public meetings, newsletters, and briefings will continue to mark major milestones of the LVE. CCWD also maintains a Web Site (http://www.lvstudies.com) for information dissemination and sharing, solicitation of comments, event postings, and communication among team members.

FUTURE ISSUES AND IMPLEMENTATION FACTORS

Numerous institutional, agency, and local issues are likely to surface as the LVE progresses toward a Feasibility Report and project implementation. Many of these issues or concerns will become better defined and more appropriate for resolution once detailed alternative plans are developed. However, various issues have been identified that should be addressed early in the next phase of the LVE, as summarized below.

- DWR is the likely non-Federal sponsor for the LVE, in conjunction with other local interests. DWR staff are participating in the formulation of alternatives. For the State to effectively move forward as a potential non-Federal sponsor, DWR will need to continue to assess alternatives with respect to its participation in other surface water storage projects as part of CALFED.
- The LVE is following established Federal planning principles and practices, which include identifying a specific set of planning objectives to address identified water resources problems and opportunities. However, because the LVE is being pursued within the context of the CALFED program, the investigation needs to consider the influence on and of other CALFED program elements as part of the planning process. This includes the potential for other planned or developing CALFED actions to address LVE objectives. For example, other CALFED storage projects also may be addressing an EWA objective similar to that of the LVE. Potential scenarios for how a new project with Federal participation would be implemented and/or integrated with existing projects (such as the CVP) also will be evaluated, as appropriate, when detailed alternative plans are formulated.
- Local cooperation requirements and willingness to participate must continue to be addressed as plan formulation progresses for the LVE. This includes addressing study objectives and corresponding Federal participation conditions, while also satisfying the principles of participating agencies and institutions.
- Because an objective of the LVE is to determine whether an expanded Los Vaqueros Reservoir could provide a less costly EWA replacement supply, studies will need to address the future value of water in California. This will require a detailed economic evaluation that considers the many factors influencing the future cost of water, including population growth, the cost of transferring water from agriculture, conveyance constraints, and hydrologic uncertainty. These studies will require close coordination with participating agencies, CALFED Common Assumptions, and other parties.
- The next phase of the feasibility investigation should continue to explore potential institutional arrangements for ownership, operation, and maintenance of a completed project. Federal, State, and local entities could participate, either jointly or individually, in a project to address the objectives of the LVE under various institutional arrangements or organizational structures.
- As detailed alternative plans emerge in the Plan Formulation Phase, the potential roles and responsibilities of Federal and non-Federal participants will need to be more fully defined, including identification of potential non-Federal sponsor(s). These roles will be influenced by the laws, regulations, and guidelines that govern each agency, the level of Federal interest, cost allocation, institutional arrangements, and the extent of Federal cost-sharing.

MOVING FORWARD

The next major step in the LVE is to further develop the initial alternatives identified in this IAIR and possibly other combinations of measures into a set of detailed alternative plans. The emphasis of upcoming studies will be on hydraulic and hydrologic system modeling, additional study of future regional water demands and economic conditions, preliminary designs and costs,

identifying potential impacts and mitigation features, and completing environmental studies and documentation. The next phase of the LVE – the Alternative Plans Phase – will be summarized in a Plan Formulation Report, anticipated in mid-2006, as shown in **Figure ES-2**. The Federal Decision Document and accompanying Environmental Impact Statement / Environmental Impact Report are scheduled for completion in late 2007.

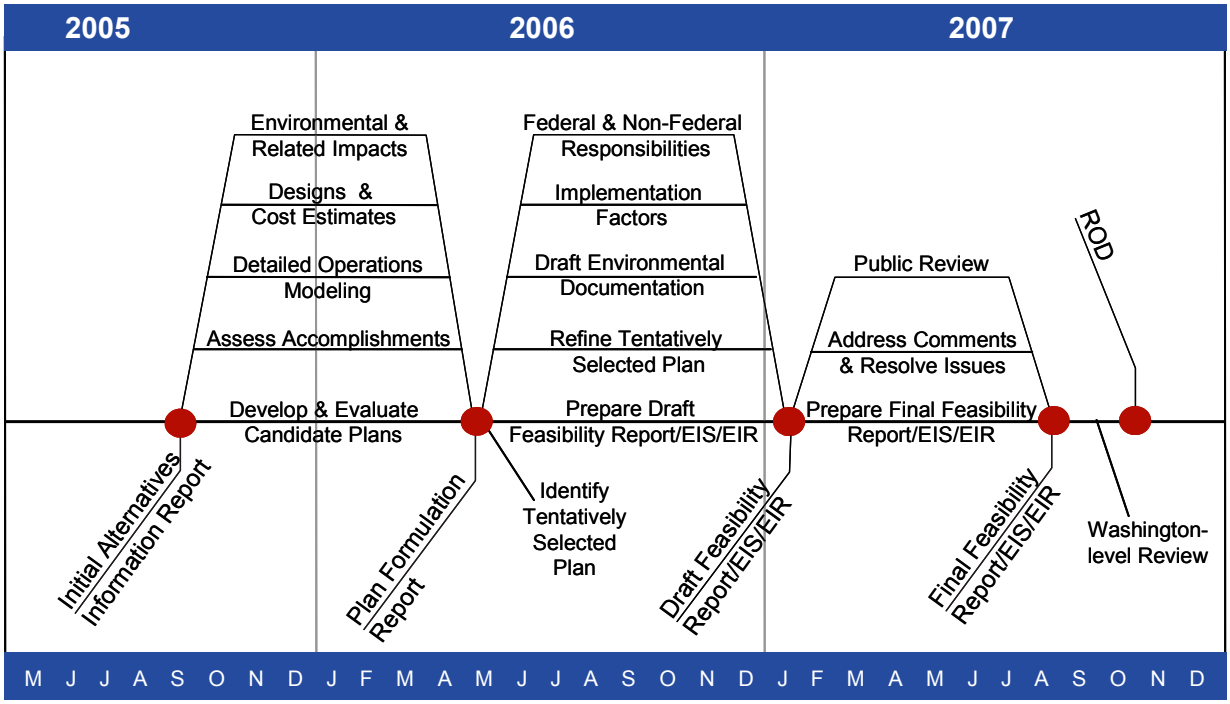

FIGURE ES-2 – LOS VAQUEROS EXPANSION INVESTIGATION SCHEDULE

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ACRONYMS AND ABBREVIATIONS

A	ACWD	Alameda County Water District
	ACWG	Agency Coordination Work Group
	AF	acre-feet
	AFPA	acre-feet per acre
	AFRP	Anadromous Fish Restoration Program
	AFY	acre-feet per year
	Agreement	Sacramento Valley Water Management Agreement
	ANN	artificial neural network
B	BA	Biological Assessment
	Bay Area	San Francisco Bay Area
	Bay-Delta	San Francisco Bay / Sacramento-San Joaquin River Estuary
	Bay-Delta Plan	Water Quality Control Plan for the San Francisco Bay / Sacramento San Joaquin Delta Estuary (California SWRCB 1995)
	BMP	best management practice
	BO	Biological Opinion
	Br	bromide
	(b)(2) water	800,000 acre-feet of water designated in Section 3406(b)(2) of the CVPIA
C	°C	degrees centigrade
	$CaCO_3$	calcium carbonate
	CALFED	CALFED Bay-Delta Program
	CALSIM	California Water Allocation and Reservoir Operations Model
	CCWD	Contra Costa Water District
	CDF	California Department of Finance
	CDFG	California Department of Fish and Game
	CDP	critically dry period
	CEQA	California Environmental Quality Act
	CFG	Customer Feedback Group
	cfs	cubic feet per second
	Cl	chloride
	COA	Coordinated Operation Agreement
	CVP	Central Valley Project
	CVPIA	Central Valley Project Improvement Act
D	D-1422	Water Rights Decision 1422, State Water Resources Control Board
	D-1485	Water Rights Decision 1485, State Water Resources Control Board
	D-1641	Water Rights Decision 1641, State Water Resources Control Board
	Delta	Sacramento-San Joaquin Delta
	DO	dissolved oxygen
	DWR	California Department of Water Resources

E	EA	Environmental Assessment
	EBMUD	East Bay Municipal Utility District
	EC	electrical conductivity
	EIR	Environmental Impact Report
	EIS	Environmental Impact Statement
	elevation	elevation in feet above mean sea level
	ERP	Ecosystem Restoration Program
	ESA	Endangered Species Act
	EWA	Environmental Water Account
F-G	°F	degrees Fahrenheit
	FONSI	Finding of No Significant Impact
	GPCPD	gallons per capita per day
H-I	hp	horsepower
	IAIR	Initial Alternatives Information Report
	IDC	interest during construction
J-K	JPOD	joint point of diversion
	Km	kilometer
	kW	kilowatt
	kWh	kilowatt-hour
L	LOD	level of development
	LTA	long-term average
	LVE	Los Vaqueros Expansion Investigation
M	µg/L	micrograms per liter
	µmhos/cm	micromhos per centimeter (equivalent to µS/cm)
	µS/cm	microSiemens per centimeter (equivalent to µmhos/cm)
	m	meter
	MAF	million acre-feet
	M&I	municipal and industrial
	MG	million gallons
	mg/L	milligrams per liter
	mm	millimeter
	mgd	million gallons per day
	msl	mean sea level
N	NEPA	National Environmental Policy Act
	NMFS	National Oceanic and Atmospheric Administration's National Marine Fisheries Service
	NODOS	North-of-the-Delta Offstream Storage
	NRHP	National Register of Historic Places
	NTU	nephelometric turbidity unit

O-P	O&M	operation and maintenance
	OCAP	Operations Criteria and Plan
	P&G	Federal Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies
	PCT	Project Coordination Team
	pH	measurement of partial hydrogen
	PL	Public Law
	PMF	Probable Maximum Flood
	ppm	parts per million
	ppt	parts per thousand
Q-R	Reclamation	U.S. Department of the Interior, Bureau of Reclamation
	ROD	Record of Decision
S	SBA	South Bay Aqueduct
	SC-RB	separable costs – remaining benefits
	SCVWD	Santa Clara Valley Water District
	SDIP	South Delta Improvements Program
	SDY	single dry year
	Semitropic GBEP	Semitropic Groundwater Banking and Exchange Program
	SFPUC	San Francisco Public Utilities Commission
	SMT	Study Management Team
	State	State of California
	SWP	State Water Project
	SWRCB	State Water Resources Control Board
T-U	TAF	thousand acre-feet
	TDS	total dissolved solids
	TKN	total Kjeldahl nitrogen
	TOC	total organic carbon
	USFWS	U.S. Fish and Wildlife Service
	UV	ultraviolet
	UWMP	Urban Water Management Plan
V-Z	VAMP	Vernalis Adaptive Management Program
	WTP	water treatment plant
	WUE	water use efficiency
	WWTP	wastewater treatment plant
	X2	distance in kilometers from the Golden Gate Bridge to where the salinity concentration is 2,640 micromhos per centimeter
	Zone 7	Alameda County Flood Control and Water Conservation District, Zone 7

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